# The Accuracy and Precision of Laboratories Analyzing Water Quality Samples for Phosphorus: An Evaluation in the Catskill Mountains of New York State

**Dennis J. McChesney[1] and Michael R. McHale[2]**

[1]USEPA Region 2/DECA/PTSB, 2890 Woodbridge Ave. Edison, NJ 08837-3679
[2]USGS - New York District, Watersheds Research Section, 425 Jordan Road, Troy, NY 12180

**Biographical Sketches of Authors**

Dennis McChesney is an environmental scientist, currently in the Division of Enforcement and Compliance Assistance, at U.S. EPA Region 2. Until recently, Dennis was a hydrologist in Region 2's Division of Environmental Science and Assessment, where he planned and implemented monitoring projects in New York, New Jersey, and Puerto Rico, and oversaw quality management for the water programs throughout the Region. His previous experience was in the drinking water/ groundwater programs where he focused on groundwater protection and remediation. Dennis previously served as co-chair of EPA's Groundwater Protection Technical Forum, and as a member of the Methods and Data Comparability Board where he chaired the Board's Outreach Workgroup. Dennis earned a B.S. in Biology from the University of San Francisco, an M.B.A. from Fairleigh Dickinson University, and M.S. in Environmental Sciences from Rutgers University, where he is currently a doctoral candidate.

Mike McHale is a hydrologist with the U.S. Geological Survey. His research focuses on the biogeochemistry of small watersheds. He is currently involved in investigations of mercury cycling in the Catskill Mountains of New York, the effect of forest harvesting on nitrogen and aluminum cycling, the effects of agricultural Best Management Practices on stream water, phosphorus concentrations in the Cannonsville Reservoir watershed, and a comparison between the Adirondack and Catskill Mountains of recovery rates from decreased of acid deposition. Mike received his Ph.D. from the SUNY College of Environmental Science and Forestry in 1999 where his research focused on the hydrologic controls of nitrogen cycling in the Adirondack Mountains. He is the author of several peer-reviewed journal articles on biogeochemistry and hydrology in small watersheds.

**Abstract**

The New York district of the U.S. Geological Survey and the U.S. Environmental Protection Agency - Region 2 conducted a study to analyze the accuracy and precision of laboratories that analyze phosphorus concentrations of natural waters within the Catskill Mountains of New York State. Ten laboratories participated in the study. Each laboratory analyzed four samples for total phosphorus (TP), total dissolved phosphorus (TDP), and soluble reactive phosphorus (SRP or orthophosphate). Three of the samples were reference samples prepared by the USGS Branch of Quality Systems (BQS). The fourth sample was a stream sample collected from the USGS gaging station at Town Brook near Hobart, New York (station USGS ID 01421618). We evaluated data comparability with the same non-parametric statistical methods used by the USGS Standard Reference Sample program. Results indicated a high level of precision for each lab (i.e., laboratories produced consistent data for the triplicate results). However half of the laboratories failed to meet accuracy targets for at least one of the four sample sets (i.e., poor interlaboratory comparability). A workshop was held in Albany, NY with study participants to evaluate the technical aspects of the study, sources of variability in the results, lessons learned, and use of comparability data in watershed evaluations. An overview of the initial study results, results from a second round of stream sample analyses, and insights from the workshop will be presented.